



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,980	12/06/2001	Thomas H. Baum	260-CIP-DIV	5984
25559	7590	03/03/2006	EXAMINER	
ATMI, INC. 7 COMMERCE DRIVE DANBURY, CT 06810			TALBOT, BRIAN K.	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/008,980	BAUM ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Brian K. Talbot	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### **Status**

1) Responsive to communication(s) filed on 19 December 2005.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### **Disposition of Claims**

4) Claim(s) 1-4,6,7,10,12-22,24-26,31-36 and 38-45 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) 6,10,12,24,25,31-34,40 and 41 is/are allowed.  
 6) Claim(s) 1-4,7,13-22,26,35,36,38,39 and 42-45 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### **Application Papers**

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### **Priority under 35 U.S.C. § 119**

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### **Attachment(s)**

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/19/05 has been entered.
2. Claims 5,8,9,11,23,27-30 and 37 are canceled. Claims 1-4,6,7,10,12-22,24-26,31-36 and 38-45 remain in the application.
3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. In light of the amendment filed 12/19/05, the 35 USC 103 rejection over Nakabayashi et al. (6,271,077) in combination with Hoke et al., "Low-temperature Vapor deposition of High-purity Iridium Coatings from Cyclooctadiene complexes of Iridium" has been withdrawn.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1,3,4,16,17-22,26,35 and 36 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Vaartstra (5,695,815).

Vaartstra (5,695,815) teaches metal carboxylate complexes for formation of metal-containing films on semiconductor devices. The metal containing group includes iridium. The metal precursor is thermally decomposed to form a metal containing film (abstract). The metal-containing film can be used to form capacitor devices including FRAMs, DRAMs and SRAMs. In addition the metal-containing film can be used to form electrodes (col. 1, lines 25-45). The metal-containing film can be a metal, metal oxide, etc (col. 1, lines 55-65). The method of coating includes spraying, dip coating and spin coating. The iridium precursor can be an Ir (I) type precursor that are soluble in organic solvents (col. 4, lines 38-45 and example 1). In example 2, the iridium precursor after deposition is rapid thermally treated in an oxidation atmosphere to form the film.

***Claim Rejections - 35 USC § 103***

6. Claims 2,7,14,38,39 and 42-45 rejected under 35 U.S.C. 103(a) as being unpatentable over Vaartstra (5,695,815).

With respect to claims 2 and 7, the claims recite particular oxidizing atmospheres whereas Vaartstra (5,695,815) is silent with regards to the “oxidizing” atmosphere. While the Examiner acknowledges this fact, the claimed oxidizing atmospheres are conventional in the art and one skilled in the art at the time the invention was made would have had a reasonable expectation of success regardless of the particular oxidizing atmosphere.

With respect to claim 14, the claim recites a critical dimension below 0.5 microns. With respect to the critical dimension claimed, it is the Examiner’s position that the critical dimensions of the final product are a “result effective variable” which is optimized by one skilled in the art depending upon the desired final product.

With respect to claims 38,39 and 42-45, the claims recite particular non-polar solvents whereas Vaartstra (5,695,815) is silent with regards to the “non-polar solvents”. While the Examiner acknowledges this fact, the claimed “non-polar solvents” are conventional in the art and one skilled in the art at the time the invention was made would have had a reasonable expectation of success regardless of the particular “non-polar solvents”.

Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaartstra (5,695,815) in combination with Nakabayashi et al. (6,271,077).

Features described above are incorporated here.

Vaartstra (5,695,815) fails to teach coating by CVD.

Nakabayashi et al. (6,271,077) teaches coating an iridium film by CVD in a hydrogen and/or oxygen atmosphere. Iridium oxide is formed when the atmosphere is oxygen. The iridium precursor is  $\text{Ir}(\text{DPM})_3$  or  $\text{Ir}(\text{acac})_3$  (col. 25, line 40 – col. 30, line 55). Iridium films can be used in capacitor manufacture with deposition of ferroelectric films such as strontium titanate ( $\text{SrTiO}_3$ ), PZT and SBT.

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Vaartstra (5,695,815) process by using the vaporizable precursor of Nakabayashi et al. (6,271,077) or to have modified Nakabayashi et al. (6,271,077) process by including an organic solvent in the iridium precursor with the expectation of achieving similar success.

***Allowable Subject Matter***

7. Claims 6,10,12,24,25,31-34,40 and 41 are allowed.

***Response to Amendment***

8. Applicant's arguments with respect to claims 1-4,7,13-22,26,35,36,38,39 and 42-45 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that the prior art failed to teach an iridium organic solvent solution as the precursor.

Vaartstra (5,695,815) teaches this limitation as detailed above.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Brian K Talbot  
Primary Examiner  
Art Unit 1762

BKT